CLAIM AMENDMENTS

1. (Currently Amended) A person's portrait generation device comprising:

an image input section which picks up two-dimensional images containing a person's face, using an image sensor;

a head area extracting section which extracts a head area from a differential image of a plurality of the two-dimensional images picked up by the image input section, wherein an outline of the head area is obtained by combining a right-side profile and a left-side profile of the differential image;

a feature detection section which detects a position of characteristic features of the face within the head area extracted;

a face outline determining section which determines a border between a face outline and a background within the head area; and

an image processing section which generates a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image using data acquired by the head area extracting section, the feature detection section, and the face outline determining section.

2. (Canceled)

3. (Currently Amended) The person's portrait generation device according to claim 2 1, wherein the outline of the head area is obtained by eliminating noise components of the right-side profile and left-side profile through filtering.

4. (Currently Amended) The person's portrait generation device according to claim 2 1, wherein the head area extracting section provides extracts the head area obtained by as a rectangular shape in which a left side, a right side, and an upper side are determined by the outline of the head area and a lower side is determined by a shape ratio constant of an average person's head.

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5. (Currently Amended) A person's portrait generation device comprising:

an image input section which picks up a two-dimensional image containing a person's face, using an image sensor;

a head area extracting section which extracts a head area from the image picked up by the image input section;

a feature detection section which detects a position of characteristic features of the face by dividing the head area extracted into face parts areas for respective face parts and finding projection data of binarized images for the respective face parts areas;

a face outline determining section which determines a border between a face outline and a background within the head area; and

an image processing section which generates a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image using data acquired by the head area extracting section, the feature detection section, and the face outline determining section.

6. (Currently Amended) The person's portrait generation device according to claim 5, wherein the face parts areas are determined by relative positional information of the face parts with respect to the head area preliminarily found.

7. (Original) The person's portrait generation device according to claim 5, wherein the position of characteristic features of the face is detected based on a position of a center-of-gravity of the projection data.

8. (Previously Presented) The person's portrait generation device according to claim 5, wherein the position of characteristic features of the face is detected based on a position of a maximum value of the projection data.

9. (Currently Amended) A person's portrait generation device comprising:

an image input section which picks up a two-dimensional image containing a person's face using an image sensor;

a head area extracting section which extracts a head area from the image picked up by the image input section;

a feature detection section which detects a position of characteristic features within the head area extracted;

a face outline determining section which determines a border between a face outline and a background within the head area by specifying a skin color area of the two-dimensional image, wherein, with respect to an average color near the characteristic features of the face, areas having similar colors are used as face area candidates; and

an image processing section which generates a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image using data acquired by the head area extracting section, the feature detection section, and the face outline determining section.

10. (Currently Amended) The person's portrait generation device according to claim 9, wherein the face outline determining section determines an outline of a jaw.

11. (Previously Presented) The person's portrait generation device according to claim 9, wherein, in the face outline determining section, the skin color area is determined by converting an RGB value to an HSV value.

12. (Canceled)

13. (Currently Amended) A person's portrait generation device comprising:

an image input section which picks up a two-dimensional image containing a person's face using an image sensor;

a head area extracting section which extracts a head area from the image picked up by the image input section;

a feature detection section which detects a position of characteristic features of the face for each of face parts within the head area that has been extracted;

a face outline determining section which determines a border between a face

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outline and a background within the head area; and

an image processing section which ~~generates~~ changes the two-dimensional image per each face part to generate a person's portrait in which the characteristic features of the face are emphasized ~~by changing the two-dimensional image with respect to each of face parts~~.

14. (Currently Amended) The person's portrait generation device according to claim 13, wherein the image processing section ~~expresses a~~ changes the two-dimensional image to express the person's emotions by changing a shape of a partial image ~~at~~ of each of an eye portion, a nose portion, and a mouth portion that are the characteristic features of the face.

15. (Currently Amended) The person's portrait generation device according to claim 13, wherein the image processing section replaces partial images ~~at~~ of an eye portion, a nose portion, and a mouth portion that are the characteristic features of the face with other partial images.

16. (Currently Amended) A communication terminal comprising:

an image input section which picks up two-dimensional images containing a person's face using an image sensor;

a head area extracting section which extracts a head area from a differential image of a plurality of the two-dimensional images picked up by the image input section, wherein an outline of the head area is obtained by combining a right-side profile and a left-side profile of the differential image;

a feature detection section which detects a position of characteristic features of the face within the head area extracted;

a face outline determining section which determines a border between a face outline and a background within the head area; and

an image processing section which generates a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image,

using data acquired by the head area extracting section, the feature detection section, and the face outline determining section, wherein the person's portrait is transmitted and received through a communication unit.

17. (Canceled)

18. (Currently Amended) The communication terminal according to claim ~~17~~ 16, wherein the outline of the head area is obtained by eliminating noise components of the right-side profile and left-side profile through filtering.

19. (Currently Amended) The communication terminal according to claim 17 ~~17~~ 16, wherein the head area extracting section ~~provides~~ extracts the head area ~~obtained by~~ as a rectangular shape in which a left side, a right side, and an upper side are determined by the outline of the head area and a lower side is determined by a shape ratio constant of an average person's head.

20 (Currently Amended) A communication terminal comprising:
an image input section which picks up a two-dimensional image containing a person's face using an image sensor;
a head area extracting section which extracts a head area from the image picked up by the image input section;
a feature detection section which detects a position of characteristic features of the face by dividing the head area extracted into face parts areas for respective face parts and finding projection data of binarized images for the respective face parts areas;
a face outline determining section which determines a border between a face outline and a background within the head area; and
an image processing section which generates a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image using data acquired by the head area extracting section, the feature detection section, and the face outline determining section, wherein the person's portrait is transmitted and

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received through a communication unit.

21. (Currently Amended) The communication terminal according to claim 20, wherein the face parts areas are determined by relative positional information of the face parts with respect to the head area ~~preliminarily found~~.

22. (Original) The communication terminal according to claim 20, wherein the position of characteristic features of the face is detected based on a position of a center-of-gravity of the projection data.

23. (Previously Presented) The communication terminal according to claim 20, wherein the position of characteristic features of the face is detected based on a position of a maximum value of the projection data.

24. (Currently Amended) A communication terminal comprising:

an image input section which picks up a two-dimensional image containing a person's face using an image sensor;

a head area extracting section which extracts a head area from the image picked up by the image input section;

a feature detection section which detects a position of characteristic features within the head area extracted;

a face outline determining section which determines a border between a face outline and a background within the head area by specifying a skin color area of the two-dimensional image, wherein, with respect to an average color near the characteristic features of the face, areas having similar colors are used as face area candidates; and

an image processing section which generates a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image using data acquired by the head area extracting section, the feature detection section, and the face outline determining section, wherein the person's portrait is transmitted and received through a communication unit.

25. (Currently Amended) The communication terminal according to claim 24, wherein the face outline determining section determines <u>an</u> outline of a jaw.

26. (Previously Presented) The communication terminal according to claim 24, wherein, in the face outline determining section, the skin color area is determined by converting an RGB value to an HSV value.

27. (Canceled)

28. (Currently Amended) A communication terminal comprising:

an image input section which picks up a two-dimensional image containing a person's face using an image sensor;

a head area extracting section which extracts a head area from the image picked up by the image input section;

a feature detection section which detects <u>a</u> position of characteristic features of the face for each of face parts within the head area that has been extracted;

a face outline determining section which determines a border between a face outline and a background within the head area; and

an image processing section which ~~generates~~ <u>changes the two-dimensional image</u> <u>per each face part to generate</u> a person's portrait in which the characteristic features of the face are emphasized ~~by changing the two-dimensional image with respect to each of face~~ ~~parts~~, wherein the resulting person's portrait is transmitted and received through a communication unit.

29. (Currently Amended) The communication terminal according to claim 28, wherein the image processing section ~~expresses a~~ <u>changes the two-dimensional image to</u> <u>express the</u> person's emotions by changing <u>a</u> shape of a partial image ~~at~~ <u>of</u> each of an eye portion, a nose portion, and a mouth portion that are the characteristic features of the face.

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30. (Currently Amended) The communication terminal according to claim 28, wherein the image processing section replaces partial images at of an eye portion, a nose portion, and a mouth portion that are the characteristic features of the face with other partial images.

31. (Currently Amended) A person's portrait generation method comprising:

picking up two-dimensional images containing a person's face using an image sensor;

extracting a head area from a differential image of a plurality of the two-dimensional images picked up, wherein an outline of the head area is obtained by combining a right-side profile and a left-side profile of the differential image;

detecting a position of characteristic features within the head area extracted;

determining a border between a face outline and a background within the head area; and

creating a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image, using output data obtained in extracting the head area, detecting the position of characteristic features, and determining the border.

32. (Canceled)

33. (Currently Amended) The person's portrait generation method according to claim 32 31, wherein the outline of the head area is obtained by eliminating noise components of the right-side profile and left-side profile by filtering.

34. (Currently Amended) The person's portrait generation method according to claim 32 31, wherein extracting the head area provides the head area in is extracted as a rectangular shape in which a left side, a right side, and an upper side are determined by the outline of the head area, and a lower side is determined by a shape ratio constant of an average person's head.

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35. (Currently Amended) A person's portrait generation method comprising:

picking up a two-dimensional image containing a person's face using an image sensor;

extracting a head area from the image picked up;

detecting a position of characteristic features of the face by dividing the head area extracted into face parts areas for respective face parts and finding projection data of binarized images for the respective face parts areas;

determining a border between a face outline and a background within the head area; and

creating a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image, using data acquired in extracting the head area, detecting the position of the characteristic features and determining a the border.

36. (Currently Amended) The person's portrait generation method according to claim 35, wherein the face parts areas are determined by relative positional information of the face parts with respect to the head area preliminarily found.

37. (Original) The person's portrait generation method according to claim 35, wherein the position of characteristic features of the face is detected based on a position of a center-of-gravity of the projection data.

38. (Previously Presented) The person's portrait generation method according to claim 35, wherein the position of characteristic features of the face is detected based on a position of a maximum value of the projection data.

39. (Currently Amended) A person's portrait generation method comprising:

picking up a two-dimensional image containing a person's face using an image sensor;

extracting a head area from the image picked up;

detecting a position of characteristic features within the head area extracted;

determining a border between a face outline and a background within the head area by specifying a skin color area of the two-dimensional image, wherein, with respect to an average color in the vicinity of the characteristic features of the face, areas having similar colors are determined as face area candidates; and

creating a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image, using data acquired in extracting the head area, detecting the position of the characteristic features, and determining a the border.

40. (Currently Amended) The person's portrait generation method according to claim 39, wherein, in determining a border, the an outline of a jaw is determined.

41. (Previously Presented) The person's portrait generation method according to claim 39, wherein, in determining the border, the skin color area is determined by converting an RGB value to an HSV value.

42. (Canceled)

43. (Currently Amended) A person's portrait generation method comprising:

picking up a two-dimensional image containing a person's face using an image sensor;

extracting a head area from the image picked up;

detecting a position of characteristic features of the face for each of the face parts within the head area that has been extracted;

determining a border between a face outline and a background within the head area; and

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~~creating~~ changing the two-dimensional image per each face part to generate a person's portrait in which the characteristic features of the face are emphasized ~~by changing the two-dimensional image with respect to each of the face parts~~.

44. (Currently Amended) The person's portrait generation method according to claim 43, wherein, changing a shape of a partial image ~~at~~ of each of an eye portion, a nose portion, and a mouth portion that are the characteristic features of the face in treating the person's portrait to express the person's emotions.

45. (Currently Amended) The person's portrait generation method according to claim 43, wherein, in treating the person's portrait, replacing partial images ~~at~~ of an eye portion, a nose portion, and a mouth portion that are the characteristic features of the face, with other partial images.

46. (Currently Amended) A communication method using a communication terminal comprising:

picking up two-dimensional images containing a person's face using an image sensor;

extracting a head area from a differential image of a plurality of the two-dimensional images picked up, wherein an outline of the head area is obtained by combining a right-side profile and a left-side profile of the differential image;

detecting a position of characteristic features within the head area extracted;

determining a border between a face outline and a background within the head area;

creating a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image, using output data obtained in extracting the head area, detecting the position of characteristic features, and determining the border; and

when a communication is received, the person's portrait thus created is displayed so as to inform a user of receipt of the communication.

47. (Currently Amended) A communication method using a communication terminal comprising:

picking up a two-dimensional image containing a person's face using an image sensor;

extracting a head area from the image picked up;

detecting a position of characteristic features of the face by dividing the head area extracted into face parts areas for respective face parts and finding projection data of binarized images for the respective face parts areas;

determining a border between a face outline and a background within the head area;

creating a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image, using data acquired in extracting the head area, detecting the position of the characteristic features, and determining a the border; and

when a communication is received, the person's portrait thus created is displayed so as to inform a user of receipt of the communication.

48. (Currently Amended) A communication method using a communication terminal that comprises:

picking up a two-dimensional image containing a person's face using an image sensor;

extracting a head area from the image picked up;

detecting a position of characteristic features within the head area extracted;

determining a border between a face outline and a background within the head area by specifying a skin color area of the two-dimensional image, wherein, with respect to an average color in the vicinity of the characteristic features of the face, areas having similar colors are determined as face area candidates;

creating a person's portrait in which the characteristic features of the face are emphasized based upon the two-dimensional image, using data acquired in extracting the

head area, detecting <u>the</u> position of the characteristic features, and determining <s>a</s> <u>the</u>

border; and

when a communication is received, the person's portrait thus created is displayed

so as to inform a user of receipt of the communication.

49. (Currently Amended) A communication method using a communication

terminal that comprises:

picking up a two-dimensional image containing a person's face using an image

sensor;

extracting a head area from the image picked up;

detecting <u>a</u> position of characteristic features of the face for each of the face parts

within the head area that has been extracted;

determining a border between a face outline and a background within the head

area;

<s>creating</s> <u>changing the two-dimensional image per each face part to generate</u> a

person's portrait in which the characteristic features of the face are emphasized <s>by</s>

<s>changing the two-dimensional image with respect to each of the face parts</s>; and

when a communication is received, the person's portrait thus created is displayed

so as to inform a user of receipt of the communication.

50. (Currently Amended) A recording medium in which is recorded a person's

portrait generation program for execution by a computer, and comprising:

a head area extracting program for extracting a head area of a person from a

differential image of a plurality of two-dimensional images picked up by an image input

section;

a feature detection program for detecting positions of characteristic features of the

person's portrait by dividing the head area into face parts areas for respective face parts,

finding projection data of binarized images for the respective face parts areas and

detecting <s>the</s> <u>a</u> position of each of the face parts based upon a center-of-gravity position

of the projection data;

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a face outline determining program for determining a border between a face outline and a background within the head area by specifying a skin color area of the two-dimensional image; and

an image processing program for ~~creating~~ changing the two-dimensional image per each face part of a person's portrait in which the ~~characteristics~~ characteristic features in the person's face are emphasized ~~by changing the two-dimensional image with respect to each of the face parts~~.